

REMARKS

The Office Action dated December 8, 2006 has been reviewed carefully and the application has been amended in a sincere effort to place it in condition for allowance. All objections and rejections have been addressed herein.

Claims 3-10, 15 and 16 are pending in the case. Claims 1-2 have been cancelled and claims 11-14 have been cancelled herein, without prejudice, in response to the Restriction Requirement.

Claim Objections

Claims 8-10 were objected to based upon erroneous dependency. Claims 8 -10 have been amended herein as needed such that these claims are directly or indirectly dependent upon rewritten claim 5, which has been indicated as allowable if rewritten in independent form. Accordingly, it is respectfully submitted that claims 8 through 10 are also allowable.

Claim Rejections

Claims 1, 4, 6, 7, 10 and 15 were rejected as being anticipated under 35 U.S.C. §102(e) as being anticipated by United States Patent No. 6,620,538 to Bai et al., ("Bai").

Bai describes a system for measuring equivalent series resistance (ESR) using a technique that involves a shunting operation that includes shorting the anode to the cathode of a fuel cell and measuring ESR during the shunting operation (Col. 5, lines 35 -46)

In sharp contrast, Applicant's invention does not simply short the anode to the cathode, but instead includes, in one embodiment, a constant current sink 252 is used to set an initial stack current. After a brief period, the stack output voltage is measured. Next a new stack current is set using the sink circuit 252, and the resulting new stack output voltage is measured and this measurement is used to calculate the resistance, as described in the Specification at page 11, lines 1-13. Claim 1 has been cancelled, however new claim 17 includes these limitations. It is respectfully submitted that Bai does not anticipate the Applicant's invention as set forth in amended independent claim 17 and the claims dependent therefrom due to the absence from Bai of *coupling constant current with the fuel cell to set stack current using a constant current sink having an operational amplifier configured to receive a control voltage as an input and coupled at an output to a power transistor; and having a second input coupled between said power transistor and a sense resistor and changing the fuel cell current using said constant current sink.*

With respect to claim 4, Bai mentions that the voltage provided across terminals 62 and 64 is normally provided to a load 66, e.g., at times outside of the shunting operations or at times of maintenance or non-use of a particular fuel cell or cartridge (Col. 12, lines 59-63). This does not anticipate Applicant's features of *allowing the fuel cell stack voltage to stabilize at a first voltage level, switching a fixed resistance load onto said fuel cell, removing the fixed resistance, substantially immediately measuring the new*

stack voltage and calculating the fuel cell resistance based upon the change between the first voltage level and the new stack voltage.

With respect to claim 15, Bai does not disclose or anticipate Applicant's inventive features of *using a fuel cell stack to produce power that can be supplied to a battery or load; and switching a fixed load across said fuel cell stack*. Bai only mentions as indicated above, that the single fuel cell voltage is provided to a load during times that the shunting operation is not being performed or when the fuel cell is not in use.

Accordingly, it is respectfully submitted that Applicant's invention as claimed in the amended claims herein, is not anticipated by the Bai reference.

At paragraph 5 of the Office Action, claims 1, 2 and 7 were rejected under 35 U.S.C. §102(e) as being anticipated by WO 03/092093. Claims 1 and 2 have been cancelled, claim 7 is now dependent upon allowable claim 5, and thus claim 7 is also allowable. It is noted that new claim 17 and the claims dependent therefrom are not anticipated by the '093 reference because that reference describes applying a constant current, but then cutting off the current entirely (not using a circuit to set a desired current) and then analyzing the voltage. It is respectfully submitted that the '093 reference does not anticipate Applicant's invention due to the absence therefrom of *coupling constant current with the fuel cell to set stack current using a constant current sink having an operational amplifier configured to receive a control voltage as an input and coupled at an output to a power transistor; and having a second input coupled between said*

power transistor and a sense resistor and changing the fuel cell current using said constant current sink.

Accordingly, due to the absence from the '093 reference of these features, it is respectfully submitted that Applicant's invention as claimed is not anticipated by the cited reference.

Allowable Subject Matter

Claim 15 was indicated as allowable if rewritten in independent form including all of the limitations of the base claim. Applicant has rewritten claim 15 herein but has omitted repetitive limitations that would have appeared from original claim 1.

Applicant gratefully acknowledges the allowance of claim 16.

All objections and rejections have been addressed herein. It is respectfully submitted that the application is now in condition for allowance.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,

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